The Bioscan AN INTERNATIONAL QUARTERLY JOURNAL OF LIFE SCIENCES 19(3): 249-253, 2024 www.thebioscan.com

An In-Depth Analysis of Cancer Trends and Implication from Champhai District of Mizoram, Northeastern India.

Beihrosa Solo [1], Lalhmangaihzuali Ralte[2*], & Lalramliana, C[3]

[1]Department of Zoology, Govt. Serchhhip College, Serchhip, Mizoram, India, 796181

E-mail: beihrosasolo@yahoo.com

[2] Department of Botany, Govt. Serchhhip College, Serchhip, Mizoram, India, 796181

E-mail: teteiralte03@gmail.com

[3] Department of Mathematics, Govt. Zirtiri Residential Science College, Aizawl, Mizoram, India, 796001

E-mail: ramteac@gmail.com

DOI: https://doi.org/10.63001/tbs.2024.v19.i03.pp249-253

KEYWORDS
Champhai,
Cancer

Received on:
11-01-2024

Accepted on:
12-02-2024

Published on:
16-03-2024

ABSTRACT

A retrospective study was conducted to analyze the prevalence and distribution of cancer types in 807 patients from Champhai District, Mizoram, northeastern India, during the period 2015–2020. The study identified 30 distinct types of cancer, with stomach cancer being the most common, accounting for 20.20% (163 cases), followed by lung cancer at 15.61%. Breast cancer emerged as the third most prevalent cancer, contributing 8.55% (69 cases) and was notably common among the female population. Moderately occurring cancers included bone cancer (3.22%), colon cancer (3.35%), gall bladder cancer (3.59%), mouth cancer (3.84%), and rectum cancer (3.59%). Cancers of lower occurrence included brain cancer, thyroid cancer, ovary cancer, skin cancer, and prostate cancer. Rare cancer types identified included anus/anal cancer (0.12%), eye cancer (0.25%), kidney cancer (0.74%), larynx cancer (0.74%), leukemia (0.12%), tongue cancer (0.62%), throat cancer (0.37%), tonsil cancer (0.37%), mesenteric cancer (0.12%), penile cancer (0.99%), and urinary bladder cancer (0.25%). These findings highlight the diversity in cancer prevalence within the study area, emphasizing the need for region-specific cancer prevention and management strategies.

INTRODUCTION

Cancer is a complex and multifactorial disease involving various genetic, lifestyle, and environmental factors. It is characterized by the uncontrolled growth of abnormal cells, leading to over 100 distinct diseases. The effects of cancer vary significantly depending on the type, stage, and location of the cancer, as well as individual patient factors (American Cancer Society, 2023; National Cancer Institute, 2023).

Cancer is an increasingly significant public health issue in Mizoram, a state in northeastern India, which has the highest cancer incidence rate in the country. The region has seen an alarming rise in cases over the past two decades, with stomach and lung cancers being the most prevalent among men and women, respectively. Several factors contribute to this trend, including high rates of smoking, dietary habits, genetic predispositions due to endogamy, and environmental influences such as betel nut consumption, which is common in the region (Zomawia *et al.*, 2023).

The healthcare challenges in Mizoram further exacerbate the problem. Limited access to specialized diagnostic and treatment facilities, a shortage of skilled healthcare professionals, and difficult terrain complicate timely medical intervention. Public awareness about cancer prevention and early detection also remains inadequate, underscoring the need for education campaigns and improved healthcare infrastructure (Zomawia *et al.*, 2023).

Mizoram has one of the highest rates of tobacco consumption in India, with both smoking and smokeless forms being prevalent. Betel nut chewing, often combined with tobacco, is a widespread practice in the region and is a significant risk factor for oral and esophageal cancers (Guha *et al.*, 2014; Lee *et al.*, 2011). Studies have linked these habits to the high incidence of cancers in Mizoram, particularly among men and women engaged in these practices (ICMR-NCDIR, 2021). The state has one of the highest rates of alcohol consumption in India. The use of alcohol, especially in large quantities over extended periods, is strongly linked to cancers of the mouth, liver, and gastrointestinal tract (Bagnardi *et al.*, 2015; Seitz & Stickel, 2007). Mizoram's social and cultural practices involving alcohol consumption also contribute to this public health issue. While there are fewer studies on diet and cancer in Mizoram, in general, poor dietary habits (such as a high-fat, low-fiber diet) can contribute to various cancers, including colorectal cancer (Slattery *et al.*, 1997). The traditional Mizo diet, which includes substantial amounts of meat and fermented foods, could contribute to an increased risk of certain cancers, particularly those related to the gastrointestinal system

(Deka &Vita, 2018; Kim & Park, 2019). Meat consumption, particularly in the form of smoked or processed meats, has been linked to various health risks, including cancer due to the formation of harmful compounds like polycyclic aromatic hydrocarbons during high-heat cooking (Romero *et al.*, 2021). Fermented foods, such as fermented pork fat (Sa-um), are common in the Mizo diet and have also been associated with health risks. These foods, rich in saturated fats, could contribute to conditions such as diabetes, and excessive salt intake has also been a concern (Lalrohlui *et al.*, 2021).

Cancer has been the leading cause of death and problematic disease all over the world (Sung *et al.*, 2021). There could be several factors contributing to the etiology of cancer which includes genetic, environmental, hormonal, viral etc. (Anand *et al.*, 2008). Champhai District is one of the eleven districts of the state Mizoram which is located in the northeastern part of India. Cancer has been one of the most prevalent disease and the leading cause of death in recent years especially among the senior and old age group in Mizoram. The most common types of cancer in Mizoram are cervical, breast, lung, stomach, and liver cancer (Dikshit *et al.*, 2020). These types align with national trends in India, though Mizoram faces particularly high rates of certain cancers, especially in men, due to lifestyle factors and tobacco use. Tobacco-related cancers, such as those of the oral cavity and esophagus, are especially prevalent. The prevalent of cancer incidence cases rose by 10.3% from 2012 to 2018 and the mortality rate is higher than national average, with 65.6% mortality rate among cancer patients

Study area

Champhai District is a picturesque region located in the northeastern state of Mizoram, India, and is renowned for its scenic landscapes and rich cultural heritage. Nestled in the foothills of the Himalayas, Champhai serves as a key district in Mizoram due to its strategic location near the Indo-Myanmar border, making it an important hub for cross-border trade and cultural exchange. The district is often referred to as the "Rice Bowl of Mizoram" due to its extensive paddy fields and agricultural significance. The population of Champhai is primarily Mizo, and the community is known for its vibrant traditions, festivals, and music. Most of the population resides in rural areas, with a few urban centers such as Champhai town serving as the administrative and economic hub. Despite its natural beauty and cultural richness, Champhai faces challenges in terms of healthcare infrastructure and accessibility, particularly in addressing chronic diseases like cancer. Studies focusing on cancer incidence in Champhai contribute significantly to understanding the health dynamics in the region and aid in formulating effective public health interventions.

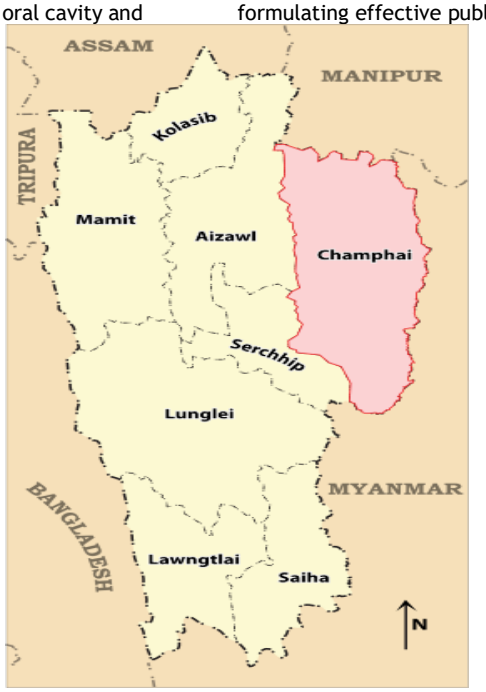

Fig.1: Champhai District Map of Mizoram, India.

Methodology

The study was a hospital-based research project, with data collected from the Population-Based Cancer Registry (PBCR) at Civil Hospital Aizawl, Mizoram. All cancer-related information was derived from hospital diagnostic records, ensuring the accuracy and reliability of the data. The research covered the period from 2015 to 2020 and focused on cancer cases within the Champhai District of Mizoram. To analyze the data, Microsoft Excel was employed to compare various parameters related to cancer patients. These parameters included the gender distribution of cases, comparisons across different age groups, and the frequency of cancer occurrence expressed as percentages. This analytical approach provided a comprehensive understanding of cancer patterns, trends, and demographics within the study area, offering valuable insights for public health planning and cancer management in the region.

Results and discussion

A study conducted in Champhai District, Mizoram, northeastern India, revealed the occurrence of 807 cancer patients from 2015 to 2020 and identified 30 different types of cancer. Stomach cancer was the most prevalent, comprising 20.20% (163 cases), followed by lung cancer at 15.61%. Breast cancer, primarily affecting females, ranked third with 8.55% (69 cases). Oesophageal cancer was the fifth most common, accounting for 6.07% (49 cases) and affecting both genders, with findings suggesting that lifestyle and diet play a significant role in its occurrence. Liver cancer ranked sixth, representing 5.33% (43 cases) and exhibiting a high mortality rate. Additionally, nasopharyngeal cancer accounted for 4.09% (33 cases), making it another frequently observed cancer type in the region.

There are five cancer types with moderate occurrence - bone cancer, colon cancer, gall bladder cancer, mouth cancer and rectum cancer each contributed 3.22%, 3.35%, 3.59%, 3.84% and 3.59% respectively. Neck cancer, with 17 reported cases accounting for 2.11%, was also identified as a less common form of moderate cancer type in the study area.

Six types of cancer were identified as less common, each contributing between 1% and 1.8% of cases: brain cancer (1.61%), thyroid cancer (1.86%), ovarian cancer (1.12%), skin cancer (1.12%), uterine cancer (1.12%) and prostate cancer (1.24%). The rarest forms of cancer, contributing less than 1% in the study area, included anal cancer (0.12%), eye cancer (0.25%), kidney cancer (0.74%), laryngeal cancer (0.74%), leukemia (0.12%), tongue cancer (0.62%), throat cancer (0.37%), tonsil cancer (0.37%), skin

cancer (0.99%), mesenteric cancer (0.12%), penile cancer (0.99%), and urinary bladder cancer (0.25%).

The study also reported cancer occurrence across various age groups, ranging from 0-9 years to 80-89 years. It found that the 50-59 age group had the highest incidence of cancer, followed by the 60-69 age group. The 70-79 age group ranked third, followed by the 30-39 age group. The 80-89 age group closely trailed the 30-39 age group, ranking fifth. Cancer incidence was significantly lower in individuals under 30 years, with minimal cases reported in the 10-19 age group. Notably, no cancer cases were recorded in the 0-9 age group during the study period.

The research also revealed that the highest number of cancer cases occurred in 2015, with a total of 156 cases, followed by 2019 with 147 cases. The lowest number of cases was recorded in 2020, with 120 cases. In 2016 and 2018, there were 132 and 133 cases, respectively. Meanwhile, 2017 reported 128 cases, making it the second-lowest year for cancer incidence in the Champhai District of Mizoram during the study period.

The present study also examined the frequency of cancer occurrence across genders. In 2015, the number of cancer cases was significantly higher among males, with 94 cases compared to 62 cases in females. Conversely, in 2016, females reported more cases, with 76 compared to 56 in males. In 2017, the trend shifted again, with males recording 76 cases and females 52. This alternating pattern of cancer incidence between males and females persisted throughout the study period, except in 2018 and 2020, which showed minimal differences. The findings suggest that cancer incidence affects both genders equally, with no significant gender disparity in the study area.

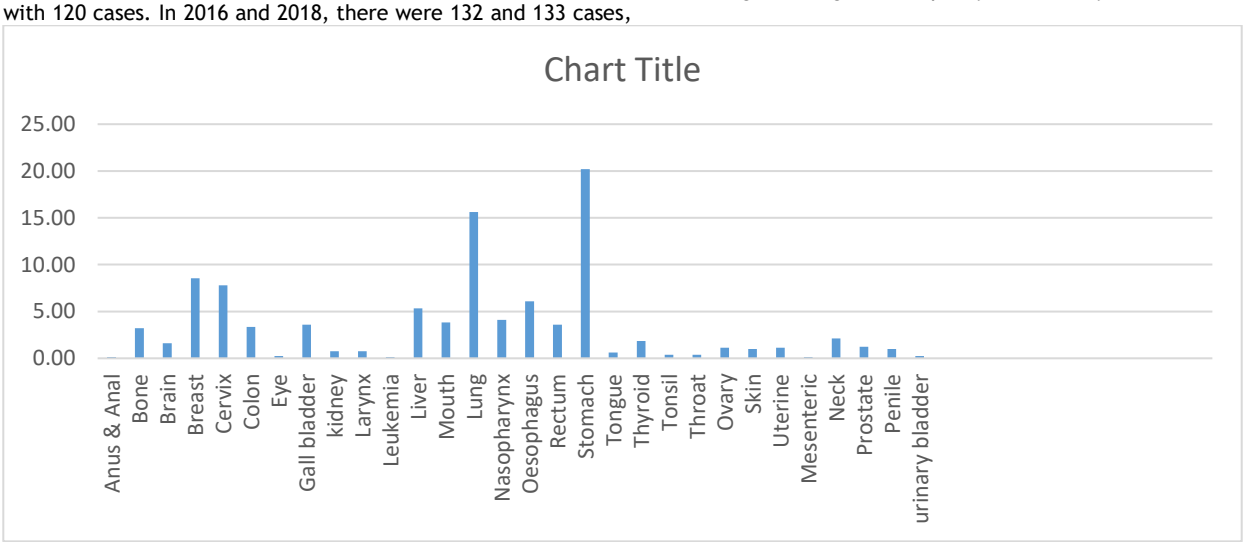

Fig. 2: Cancer types from Champhai District of Mizoram, India

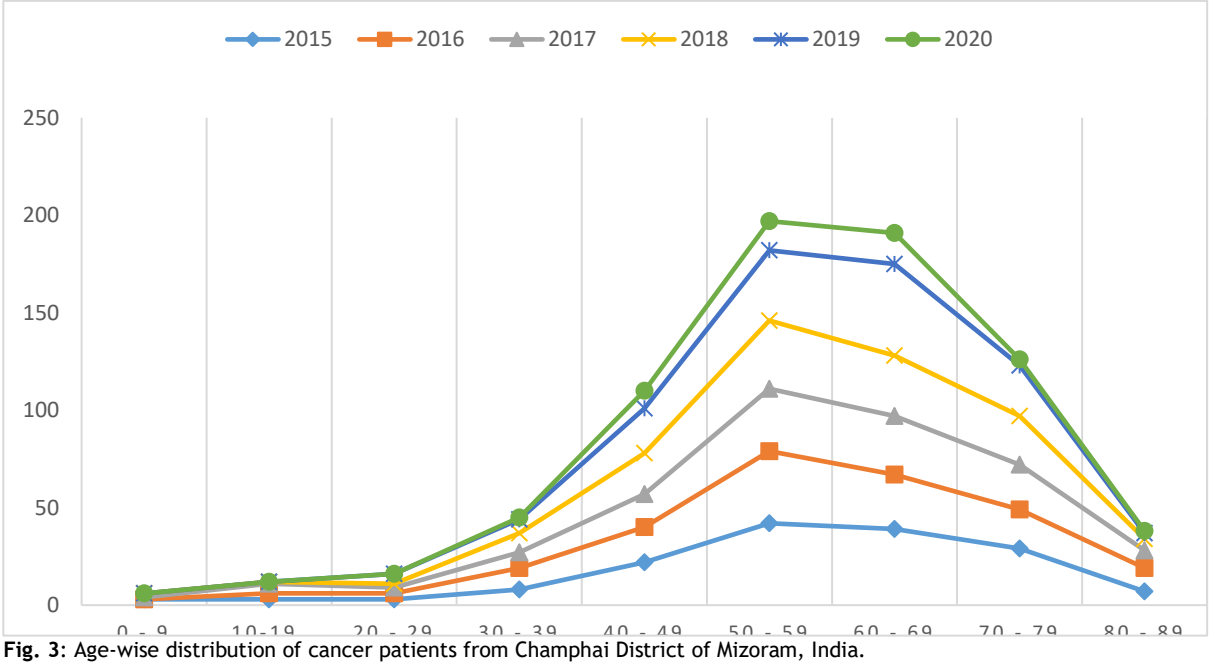

Fig. 3: Age-wise distribution of cancer patients from Champhai District of Mizoram, India.

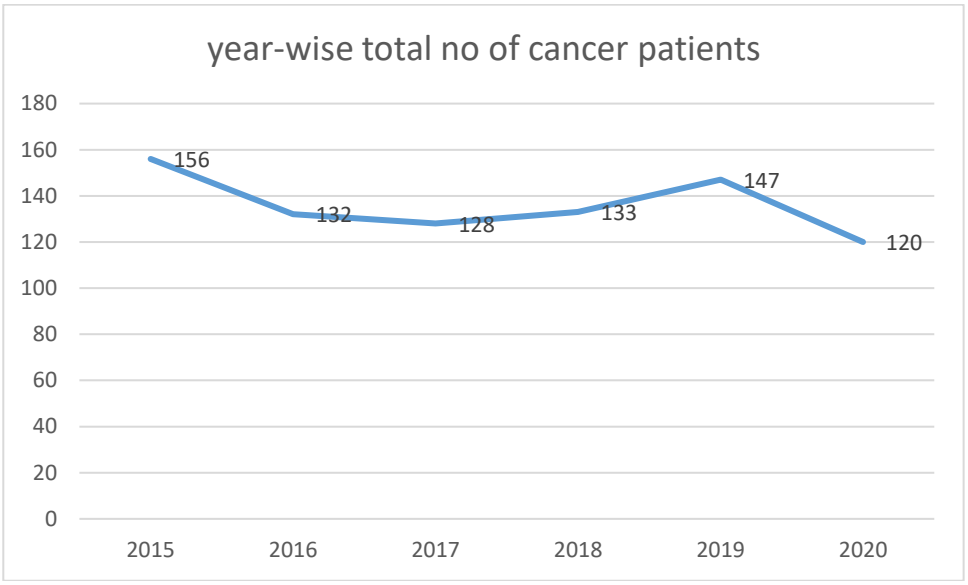

Fig.4: Year wise total number of cancer cases from Champhai District of Mizoram, India.

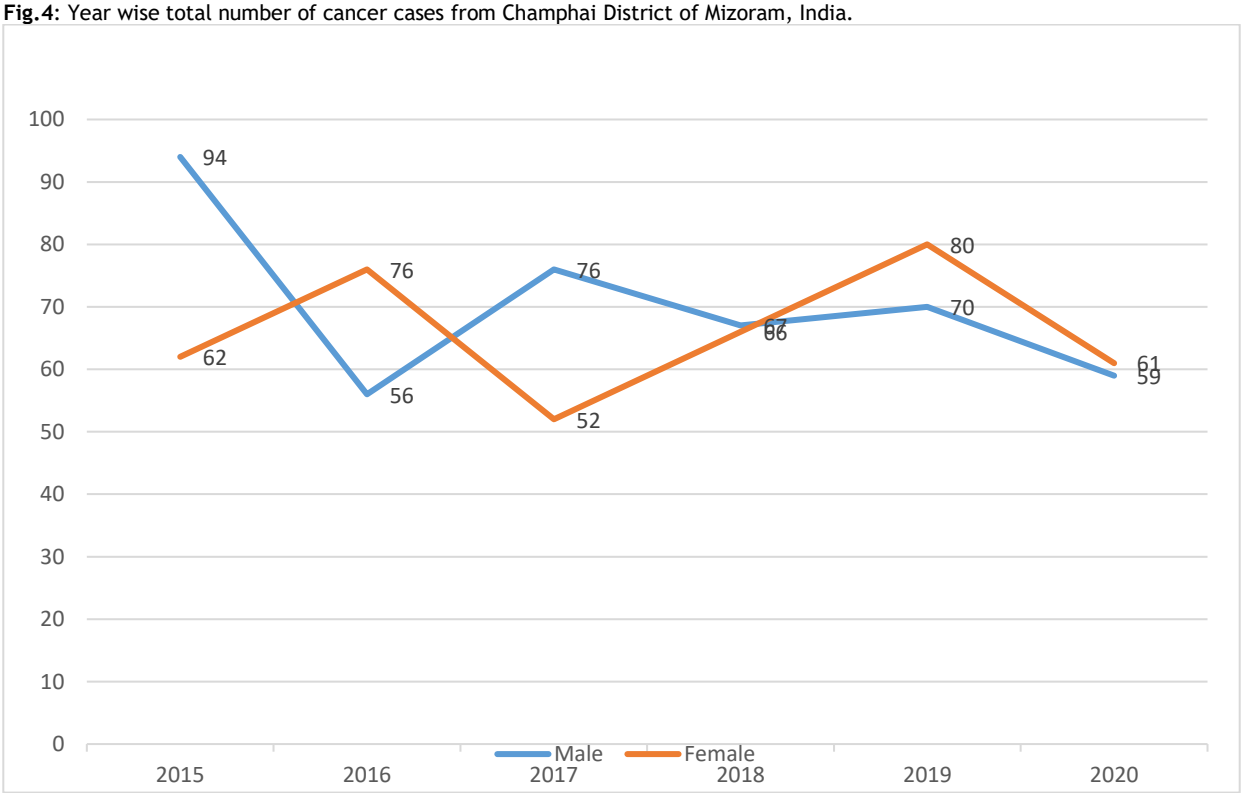

Fig.5: Comparison of Male and female cancer patients from Champhai District of Mizoram, India

Acknowledgement

The authors sincerely appreciate and acknowledge the invaluable support and cooperation of the Mizoram Population-Based Cancer Registry (PCBR) and Civil Hospital Aizawl in providing essential data for the successful completion of the cancer survey in Champhai District, Mizoram. Their assistance and resources were instrumental in ensuring the study's accuracy and comprehensiveness. The authors also extend their heartfelt gratitude to all respondents and participants who contributed to the research.

REFERENCES

- Zomawia E., Zami Z., Vanlallawma A., Nachimuthu S. (2023). Cancer awareness, diagnosis, and treatment needs in Mizoram, India: Evidence from 18 years of trends (2003-2020). *The Lancet Regional Health - Southeast Asia*, Volume 17, Article 100281.
- ICMR-NCDIR (2021) - Profile of Cancer and Related Health Indicators in the North East Region of India.
- Bagnardi, V., Rota, M., Botteri, E., Tramacere, I., Islami, F., Fedirko, V., Scotti, L., Jenab, M., Weiderpass, E., Palli, D., Ferraroni, M., La Vecchia, C., & Corrao, G. (2015). Alcohol consumption and site-specific cancer risk: A comprehensive dose-response meta-analysis. *British Journal of Cancer, 112*(3), 580-593.
- Seitz H. K., Stickel F. (2007) - "Molecular mechanisms of alcohol-mediated carcinogenesis". *Nature Reviews Cancer, 7*(8), 599-612.
- Lalrohlui F, Ghatak S., Zohminthanga J, Hruaii V., Kumar N. S (2021). Fermented pork fat (Sa-um) and lifestyle risk factors as potential indicators for type 2 diabetes among the Mizo population, Northeast India.

Journal of Health, Population and Nutrition 40 (32) : 2-7.

- Romero B. N., Olivares C.V., Dossetti G. A. B., Armendariz B. P., Ugarte G.A.C (2021). Nutritional contributions and health associations of traditional fermented foods. *Fermentation* 7(289): 2-23.
- Guha, N., Warnakulasuriya, S., Vlaanderen, J., & Straif, K. (2014). Betel quid chewing and the risk of oral and oropharyngeal cancers: A meta-analysis with implications for cancer control. *International Journal of Cancer, 135*(6), 1433–1443.
- Lee, C. H., Ko, A. M.-S., Warnakulasuriya, S., Ling, T. Y., Sunarjo, Rajapakse, P. S., Zain, R. B., Ibrahim, S. O., & Ko, Y.-C. (2011). Betel quid exposure and oral cancer risk in South and Southeast Asia and the role of alcohol and tobacco consumption. *International Journal of Cancer, 129*(7), 1741–1751.
- Slattery, M. L., Potter, J. D., Duncan, D. M., & Edwards, S. (1997). Dietary fats and colon cancer: Assessment of risk associated with specific fatty acids. *International Journal of Cancer, 73*(5), 670–677.
- Kim, M. K., & Park, J. H. (2019). Consumption of fermented soy products and risk of cancer: A meta-analysis. *Cancer Prevention Research, 12*(10), 669–679.
- Deka, A., & Vita, R. (2018). Fermented foods and cancer risk in Asian diets: A focus on northeastern India. *Asian Pacific Journal of Cancer Prevention, 19*(7), 1851–1857.
- Sung, H., Ferlay, J., Siegel, R. L., Laversanne, M., Soerjomataram, I., Jemal, A., & Bray, F. (2021). Global cancer statistics 2020: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA: A Cancer Journal for Clinicians, 71*(3), 209-249.
- Anand, P., Kunnumakkara, A. B., Sundaram, C., Harikumar, K. B., Tharakan, S. T., Lai, O. S., Sung, B., & Aggarwal, B. B. (2008). Cancer is a preventable disease that requires major lifestyle changes. *Pharmacological Research, 25*(9), 2097-2116.
- Dikshit, R., Kanhere, S., & Deo, S. (2020). Cancer incidence and mortality patterns in Mizoram, India: A retrospective analysis. *Asian Pacific Journal of Cancer Prevention, 21*(5), 1357-1365.